

is no such high level technology available.

The present invention is provided in order to solve such a problem, and an object thereof is to provide a contents preparation apparatus, a contents editing apparatus, a contents reproduction apparatus, a contents preparation method, a contents editing method, a contents reproduction method, a contents preparation program product, a contents editing program product and a portable communication terminal which can easily prepare and edit stereoscopic contents.

Disclosure of the Invention

In order to solve the above-described problem, the present invention provides a contents preparation apparatus, a contents editing apparatus, a contents reproduction apparatus, a contents preparation method, a contents editing method, a contents reproduction method, a contents preparation program product, a contents editing program product and a portable communication terminal as shown in the following.

More specifically, according to one aspect of the present invention, a contents preparation apparatus includes a depth information setting part which sets depth information for two-dimensional figure data, and an output part which outputs figure data where depth information has been set.

In addition, according to another aspect of the present invention, a contents editing apparatus editing contents where depth information has been set for two-dimensional figure data, includes a display information input part which accepts an input of depth information on the depth to be displayed, and a display part which displays only figure data where the accepted depth information has been set.

In addition, according to still another aspect of the present invention, a contents editing apparatus editing contents where depth information on the relative relationship of depth between two-dimensional figure data and a predetermined plane that is a reference plane has been set, includes a reference plane depth information setting part which sets depth information for a reference plane, and a depth editing part which edits

depth information that has been set for figure data in accordance with depth information that has been set for the reference plane.

5 In addition, according to yet another aspect of the present invention, a contents reproduction apparatus stereoscopically reproducing contents that include two-dimensional figure data where depth information has been set, includes a depth information read-out part which reads out depth information from figure data, a shift amount calculation part which selects a calculation method from among a plurality of calculation methods for amount of shift in accordance with the results of contents analysis and calculates an amount of shift in images between data for the left eye and
10 data for the right eye of the figure data on the basis of the read out depth information, a generation part which generates data for the left eye and data for the right eye on the basis of the calculated shift amount, and a reproduction part which reproduces the generated data for the left eye and data for the right eye.

15 In addition, according to yet another aspect of the present invention, a contents preparation method includes a depth information setting step of setting depth information for two-dimensional figure data, and an output step of outputting figure data where depth information has been set.

20 In addition, according to yet another aspect of the present invention, a contents editing method editing contents where depth information has been set for two-dimensional figure data, includes a display information input step of accepting an input of depth information on a depth to be displayed, and a display step of displaying only figure data where the accepted depth information has been set.

25 In addition, according to yet another aspect of the present invention, a contents editing method editing contents where depth information on the relationship of depth between two-dimensional figure data and a predetermined plane that is a reference plane has been set, includes a reference plane depth information setting step of setting depth information for the reference plane, and a depth editing step of editing depth information that has been set in figure data in accordance with depth information that has been set

for the reference plane.

In addition, according to yet another aspect of the present invention, a contents reproduction method stereoscopically reproducing contents that include two-dimensional figure data where depth information has been set, includes a depth
5 information read-out step of reading out depth information from figure data, a shift amount calculation step of calculating an amount of shift in images between data for the left eye and data for the right eye of figure data on the basis of the read out depth information, a generation step of generating data for the left eye and data for the right
10 eye on the basis of the calculated shift amount, and a reproduction step of reproducing the generated data for the left eye and data for the right eye.

In addition, according to yet another aspect of the present invention, a contents preparation program product allows a computer to execute a depth information setting
step of setting depth information for two-dimensional figure data, and an output step of
outputting figure data where depth information has been set.

15 In addition, according to yet another aspect of the present invention, a contents editing program product making a computer execute a contents editing method for editing contents where depth information has been set for two-dimensional figure data, allows a computer to execute a display information input step of accepting an input of
depth information on a depth to be displayed, and a display step of displaying only figure
20 data where the accepted depth information has been set.

In addition, according to yet another aspect of the present invention, a portable communication terminal stereoscopically reproducing contents that include two-dimensional figure data where depth information has been set, includes a depth
information read-out part which reads out depth information from figure data, a shift
25 amount calculation part, and calculates an amount of shift in images between data for the left eye and data for the right eye of figure data on the basis of the read out depth information, a generation part which generates data for the right eye and data for the right eye on the basis of the calculated shift amount, and a reproduction part which

reproduces the generated data for the left eye and data for the right eye.

Brief Description of the Drawings

5 Fig. 1 is a diagram showing a concrete example of the configuration of a contents preparation apparatus 1 according to the present embodiment.

Fig. 2 is a diagram showing a concrete example of a plan diagram of an image that is included in stereoscopic contents according to the present embodiment.

10 Fig. 3 is a diagram showing the state where the respective figures included in an image exist in the respective layers that have been set for each depth in the direction of the z axis.

Fig. 4 is a flowchart showing contents preparation processing in contents preparation apparatus 1 according to the present embodiment.

Fig. 5 is a diagram showing a concrete example of a depth information setting menu.

15 Fig. 6 is a diagram showing a concrete example of a deepness information table.

Fig. 7 is a diagram showing a concrete example of a figure table.

Fig. 8 is a diagram showing a concrete example of a screen that is displayed on 2-D display part 106 when a figure has been selected.

20 Figs. 9 and 12 are diagrams showing concrete examples of a depth information confirmation menu.

Figs. 10 and 13 are diagrams showing the state where only the figures that exist in the layers in a range of designated depths have been sampled.

25 Figs. 11 and 14 are diagrams showing concrete examples of displays on 2-D display part 106 where only figures that exist in the layers in a range of designated depths have been displayed.

Fig. 15 is a diagram showing a concrete example of an editing menu.

Fig. 16 is a diagram showing the state where deepness information that corresponds to all of the depth layers that have been prepared has been edited.

CLAIMS

1. A contents preparation apparatus comprising:
 - a depth information setting part (101, 102) which sets depth information for
5 two-dimensional figure data; and
 - an output part (108) which outputs figure data where said depth information has
been set.
2. A contents editing apparatus for editing contents where depth information
10 has been set for two-dimensional figure data, comprising:
 - a display information input part (102) which accepts an input of depth
information on the depth to be displayed; and
 - a display part (106) which displays only figure data where said accepted depth
information has been set.
- 15 3. A contents editing apparatus for editing contents where depth information
on the relative relationship of depth between two-dimensional figure data and a
predetermined plane that is a reference plane has been set, comprising:
 - a reference plane depth information setting part (102) which sets depth
20 information for said reference plane; and
 - a depth editing part (101) which edits depth information that has been set for
said figure data in accordance with said depth information that has been set for said
reference plane.
- 25 4. A contents reproduction apparatus for stereoscopically reproducing contents
that include two-dimensional figure data where depth information has been set,
comprising:
 - a depth information read-out part (205) which reads out said depth information

from said figure data;

a shift amount calculation part (205) which calculates an amount of shift in images between data for the left eye and data for the right eye of said figure data, on the basis of said read out depth information;

5 a generation part (205) which generates said data for the left eye and said data for the right eye, on the basis of said calculated shift amount; and

a reproduction part (207) which reproduces said generated data for the left eye and data for the right eye.

10 5. The contents reproduction apparatus according to claim 4, wherein a plurality of said methods for calculating said amount of shift are provided in said shift amount calculation part (205).

15 6. The contents reproduction apparatus according to claim 5, further comprising a contents analyzing part (205) which analyzes said contents, wherein said shift amount calculation part (205) calculates said amount of shift by selecting a predetermined method for calculating the amount of shift from among said plurality of methods for calculating the amount of shift in accordance with the results of contents analysis by said contents analyzing part.

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7. A contents preparation method, comprising:

a depth information setting step (S105) of setting depth information for two-dimensional figure data; and

25 an output step (S111) of outputting figure data where said depth information has been set.

8. The contents preparation method according to claim 7, further comprising a conversion step (S105) of converting said depth information set in depth information

setting step into deepness information that indicates the corresponding deepness,
wherein

in said output step (S111), said figure data to which said deepness information
converted has been added is outputted.

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9. The contents preparation method according to claim 7, further comprising:
a depth information setting display step (S105) of displaying said depth
information selectable as depth layers information; and

10 a depth information input step (S105) of accepting an input of depth information
that is to be set for said figure data on the basis of said depth information displayed in
said depth information setting display step, wherein

in said depth information setting step (S105), said depth information accepted is
set for said figure data.

15 10. The contents preparation method according to claim 7, further comprising
a figure data selection step (S105) of selecting said figure data, wherein

in said depth information setting step (S105), said depth information is set for
said figure data selected.

20 11. A contents editing method for editing contents where depth information
has been set for two-dimensional figure data, comprising:

a display information input step (S107) of accepting an input of depth
information on a depth to be displayed; and

25 a display step (S107) of displaying only figure data where said depth information
accepted has been set.

12. The contents editing method according to claim 11, wherein

in said display information input step (S107), an input of a depth range that is to

be displayed, of said depth information is accepted, and

in said display step (S107), only figure data is displayed where the depth information that corresponds to said depth range accepted has been set.

5 13. The contents editing method according to claim 11, wherein in said display information input step (S107), said figure data is displayed editable.

10 14. A contents editing method for editing contents where depth information on the relative relationships of depth between two-dimensional figure data and a predetermined plane that is a reference plane has been set, comprising:

 a reference plane depth information setting step (S105) of setting depth information for said reference plane, and;

15 a depth editing step (S105) of editing depth information that has been set in said figure data in accordance with said depth information that has been set for said reference plane.

20 15. The contents editing method according to claim 14, wherein in said depth editing step (S105), depth information that has been set for said figure data is changed on the basis of said depth information that has been set for said reference plane while maintaining said relative relationship of depth between said figure data and said reference plane.

25 16. The contents editing method according to claim 14, further comprising a figure data selection step (S106) of selecting said figure data, wherein

 in said depth editing step (S105), said depth information that has been set for said figure data selected is edited.

17. A contents reproduction method for stereoscopically reproducing contents

that include two-dimensional figure data where depth information has been set,
comprising:

a depth information read-out step (S211) of reading out said depth information
from said figure data;

5 a shift amount calculation step (S211) of calculating an amount of shift in images
between data for the left eye and data for the right eye of said figure data on the basis of
said depth information read out;

a generation step (S213) of generating said data for the left eye and said data for
the right eye on the basis of said shift amount calculated; and

10 a reproduction step (S217) of reproducing said generated data for the left eye
and data for the right eye generated.

18. A contents preparation program product for allowing a computer to
execute:

15 a depth information setting step (S105) of setting depth information for two-
dimensional figure data; and

an output step (S111) of outputting figure data where said depth information has
been set.

20 19. A contents editing program product for allowing a computer to execute a
contents editing method for editing contents where depth information has been set for
two-dimensional figure data, which allows a computer to execute:

a display information input step (S107) of accepting an input of depth
information on a depth to be displayed; and

25 a display step (S107) of displaying only figure data where said depth information
accepted has been set.

20. A portable communication terminal for stereoscopically reproducing

contents that include two-dimensional figure data where depth information has been set, comprising:

a depth information read-out part (205) which reads out said depth information from said figure data;

5 a shift amount calculation part (205) which calculates an amount of shift in images between data for the left eye and data for the right eye of said figure data, on the basis of said read out depth information;

a generation part (205) which generates said data for the left eye and said data for the right eye on the basis of said calculated shift amount; and

10 a reproduction part (207) which reproduces said generated data for the left eye and data for the right eye.

21. The portable communication terminal according to claim 20, wherein a plurality of said methods for calculating said amount of shift are provided in said shift amount calculation part (205).

22. The portable communication terminal according to claim 21, further comprising a contents analyzing part (205) which analyzes said contents, wherein said shift amount calculation part (205) calculates said amount of shift by selecting a predetermined method for calculating the amount of shift from said plurality of methods for calculating the amount of shift in accordance with the results of contents analysis by said contents analyzing part.